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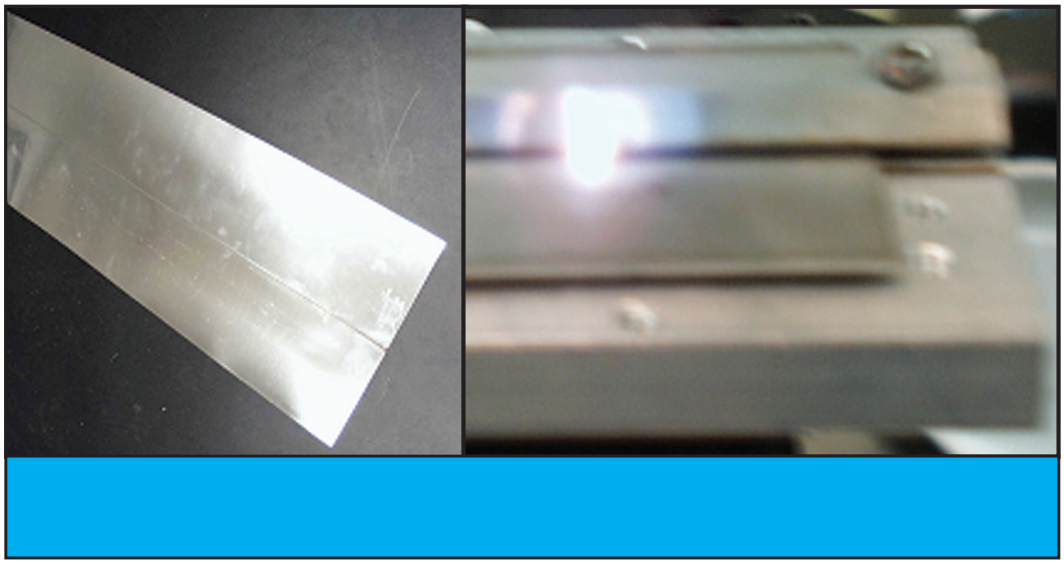
# Success Story

## ADVANCES IN LASER WELDING



By assisting Metal Tech Industries in microprocessing thin sheet metal, the Directed Energy Directorate is enabling the manufacture of many exciting new products. The first commercial application allows the manufacture of large gasket material, which fills a significant need for the petroleum, marine, locomotive, and chemical industries. These industries needed larger materials beyond the 1.0 x 1.0-meter size for some time.

These industries also have several applications requiring gaskets up to 1.5 x 1.5 meters. Lack of this product required the use of multipiece flanges. These flanges, which leak, caused many types of quality and environmental problems in manufacturing both military and civilian products. Manufacturers can use the technology arising from this effort to manufacture new products. The gasket marketplace already placed large gasket orders with Metal Tech.

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## Accomplishment

This project addressed several advanced photonic technologies and their ability to provide exacting beam qualities. This project provided important insight into those abilities.

Metal Tech Industries, in partnership with the University of Central Florida, conducted many successful experiments for microwelding sheet metals with a laser beam in the Laser-Aided Manufacturing, Materials and Microprocessing Laboratory at the School of Optics/Center for Research and Education in Optics and Lasers. This research group, headed by Dr. Aravinda Kar, found that the optical-thermal phenomena in laser welding of sheet metals are different from those observed in thick metal welding. This finding will play an important role in manufacturing technologies for years to come.

## Background

The directorate and Metal Tech Industries jointly pursued improvements in the abilities of lasers to perform microwelding of sheet metals. This effort has many potential benefits for the military and will pave the way for Metal Tech Industries to become a leader in the field of metallic gasket manufacture.

Directed Energy
Emerging Technologies

## Additional information

To receive more information about this or other activities in the Air Force Research Laboratory, contact TECH CONNECT, AFRL/XPTT, (800) 203-6451 and you will be directed to the appropriate laboratory expert. (01-DE-19)